What's HOT

UDOT'S FREEWAYS TO FUEL INITIATIVE

By: Abdul Wakil, UDOT Research Division

The Utah Department of Transportation (UDOT) has partnered with Utah State University (USU) for this green experiment to research the possibility of growing biodiesel producing, drought-tolerant crops such as canola, safflower and perennial flax adjacent to the state highways.

Mr. John Njord, UDOT Executive Director

On May 8, 2007, UDOT officials and USU researchers oversaw a seeding operation in Kaysville, north of Salt Lake City in Utah. "We predict that if everything works out just right, we could take a mile of our right-of-way and generate about 500 gallons of biodiesel per year on that right-of-way," said John Njord, UDOT Executive Director. "Now that's pretty darn significant when you consider that we have thousands of miles of right-of-way within our state." John added "Ultimately, we could have some significant cost savings,"

If this research is successful, it's possible that in the future UDOT could harvest enough seeds to make homegrown biodiesel and run its entire vehicle fleet.

Other benefits to the department would include: savings in mowing /pest control costs and aesthetic improvement by gracing weedy roadside right-of-way with red, blue and yellow flowers.

Experimental sites have been seeded in Tremonton, Kaysville and two plot areas near Mona. Part of this research is to see how well these species do in areas that aren't irrigated. Most of the test sites are adjacent to I-15. A control group was set up at USU's research farm at the Utah Botanical Gardens in Kaysville to compare seed yields (roadside yields compared to the yields on flat ground with better soil).

The roadside biodiesel idea came from USU graduate student working on his doctoral degree, Mr. Dallas Hanks. Dallas met with Ms. Shana Lindsey, Director of Research and Bridge Operations at UDOT to discuss this concept of using the UDOT right-of-way to provide the fuel needed to maintain the highway system. This idea appealed to Shana. While considering the proposal, UDOT Research Division determined that additional benefits which could be realized include improved aesthetics and reduced mowing costs to the department.

In this project, Mr. Hanks and the USU team are trying to determine if major portions of this right-of-way can be used to produce enough clean-burning, bio-diesel fuel to partially or wholly operate our fleet.

Rising fuel prices finally tripped the switch. "There really wasn't a reason to do this five years ago," Mr. Hanks said. But the steady climb of petroleum fuel costs has made the biodiesel project feasible.

Another important aspect of this concept is that it will not be affected by two of the major challenges of conventional biodiesel production: a reduction of food producing crops, and expanding farming into environmentally sensitive areas. The vast majority of UDOT right-of-way does not fall in either of these categories.

UDOT now uses about 1.5 million gallons of diesel fuel per year and owns over 5,000 miles of highway, and maintains more than 100,000 acres of right-of-way. Currently many of these areas use non-biofuel producing plants such as wheat grass to control dust and erosion. All of these areas need maintenance at the present. If these areas were put into biofuel crop production, they could serve as biofuel crop resource areas disseminating healthy, clean burning fuels into local communities.

Dr. Ralph Whitesides, USU Professor, Extension Weed Specialist and the Principal Investigator of this research project said, "We picked western exposure and southern exposures because we figured this would be our most difficult seeding operation. If it grows here, we think it's likely it will grow in other places as well."

Ralph, who also is Hanks' doctoral adviser, said the genetically modified seeds that UDOT will plant, are immune to the herbicide Round-Up, which means UDOT can still exercise weed control without harming the biodiesel crop.

By addressing efficiency, energy development and climate-change concerns, the project “has it all,” said Laura Nelson, Utah Governor Jon Huntsman’s energy policy adviser. “A lot of agencies are pursuing the conservation initiative,” she said. “This is probably the most innovative [approach].”

For more information on the research project, please contact Ms. Shana Lindsey, Director for Research and Bridge Operations rlindsey@utah.gov, Abdul Wakil, Project Manager (801) 964-4455 awakil@utah.gov ,
Dr. Ralph E. Whitesides, Principal Investigator at (435) 797-8252, ralphw@ext.usu.edu ,
Mr. Dallas Hanks, Co-Principal Investigator bluecowinc@gmail.com.

To watch the media coverage, please click on this link: http://www.usu.edu/prm/newshighlights/udotbiodiesel/

A PRIORITY PROCESS FOR ACCESS MANAGEMENT IMPLEMENTATION IN UTAH

By: Doug Anderson, UDOT Research Divsion

Appropriate access management techniques can improve the safety and efficiency of arterial highways. A prioritization process was developed for UDOT by Dr. Grant Schultz and Kordel Braley of Brigham Young University. This process determines which sections of highway can most benefit by the implementation of access management techniques.

A Performance Index was generated by using the features, characteristics, and crash history of 175 arterial road segments on Utah state routes. Stepwise linear regression was applied to the data to determine which aspects of the road segments correlated with crash rate, crash severity, and specific collision types.

Recommendations for access management treatments can be obtained using the decision tree outlined in Figure 1 to classify existing or future road segments into subcategories based on traffic volume, signal spacing, land use, and other criteria. In this way decision-makers can get an indication of which sections can benefit from controlling driveway access, where raised medians are desirable, and where no access management is needed.

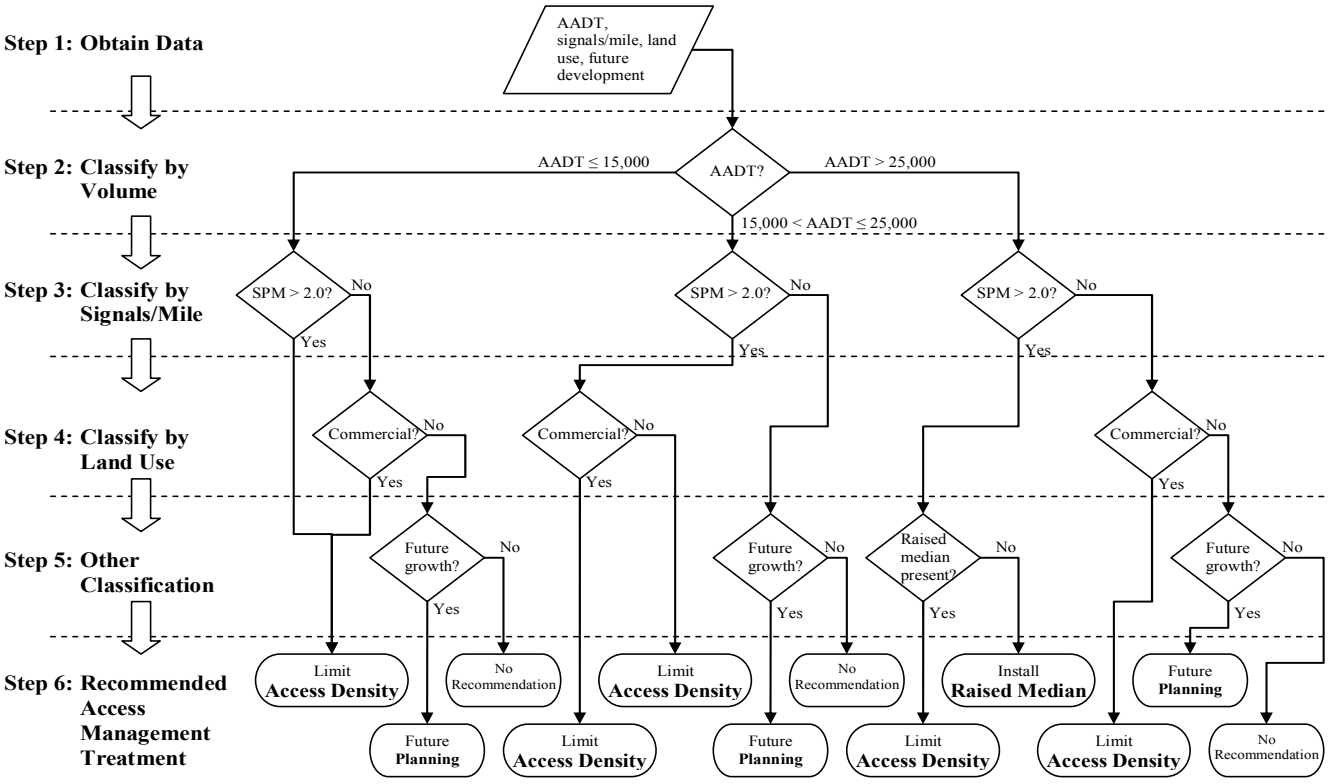


Figure 1 Decision tree for determining recommended access management techniques.

For more information about this process, please contact Mr. Grant Schultz, gschultz@byu.edu, Tim Boschert, tboschert@utah.gov, and Mr. Doug Anderson dianderson@utah.gov.

In The Know

MOVING BEYOND UTRAC:

By: Blaine Leonard, UDOT Research Division

On March 6, 2007, the Research Division sponsored another successful UTRAC Workshop. Attended by 139 people from UDOT, FHWA, our consultants, contractors, and university research partners, 79 new Problem Statements were considered by groups in nine discipline areas during the workshop. These groups prioritized 41 research topics for possible funding by the Research Division. Prioritized topics included such far reaching issues as techniques for culvert rehabilitation, accurately measuring truck traffic data, accelerated bridge construction using prefabricated elements, fatigue in asphalt pavements, effectiveness of big game crossings, and efficient snow fence configurations.

The Research Division is currently matching the prioritized Problem Statements selected at the UTRAC Workshop with available funding, to determine which projects can be initiated during this next fiscal year. Research funding typically comes from two primary sources, the federal State Planning and Research (SPR) fund, and state Construction funds. In fiscal year 2008, the Division expects to be able to apply about $1.2 million to new research projects, in addition to the projects already underway. With this available funding, about 20 projects will probably be initiated, generally representing the first and second priority projects from each of the UTRAC breakout groups. Once this funding list is approved, research project managers will begin to work with Department champions to assemble Technical Advisory Committees for each project, refine scopes, select principal investigators, and prepare contracts for the work. The selected projects will also be posted on the Research web site. Some of the priority projects will move quickly and produce results within the fiscal year, and others are slated to run for several years.

The annual UTRAC Workshop was held, once again, at the Larry Miller Campus of Salt Lake Community College, in Sandy, Utah. This venue provides comfortable space for the group to meet together in plenary sessions, and individual rooms for the breakout groups. The attendees heard presentations by Dr. Paul J. Tikalski, the new Chair of the University of Utah Civil and Environmental Engineering Department, and Dr. Kevin Womack, a professor and Director of the Utah State University Transportation Research Center. Both of these gentlemen addressed the issues of partnership and synergy between the Department of Transportation and university researchers. Another highlight of the UTRAC Workshop was the presentation of the annual UTRAC Trailblazer Award, presented to Dr. Leslie Youd, a professor at Brigham Young University who has worked successfully with UDOT on many occasions to advance our understanding of seismic issues, particularly seismically induced liquefaction. Dr. Youd is internationally recognized for his work in this area, and we are pleased to have a long working relationship with him.

The Research Division currently has sixty-five research projects underway, with a contract value of over $5.2 million. These projects span all disciplines within the Department, and serve Department personnel in the Regions and the Complex. Each of these projects helps the Department to take care of what we have, make what we have work better, increase capacity, and improve operations and safety by providing new tools, new insights and new information. In addition to these projects, the Division has many efforts underway to evaluate new products, provide training, and share research results produced by the federal government, other states, other agencies and research universities around the world. Let us know if we can be of service, or if you have any questions about anything we do. For more information about UTRAC, please contact Blaine Leonard bleonard@utah.gov or 801-965-4115.

4500 SOUTH OVER I-215 BRIDGE REPLACEMENT PROJECT:

By: Daniel Hsiao, UDOT Research Division

The Federal Highway Administration (FHWA) Highways for LIFE (HfL) program aims to bring a higher level of innovation and technology to improving the Nation's roadways. Highways for LIFE is about achieving the **L**ong lasting, **I**nnovative, and **F**ast construction of **E**fficient and safe highway infrastructure (LIFE).

Utah has been recommended by the HfL office to receive a million dollar award in 2007. It is the largest amount eligible for a single project in this program.

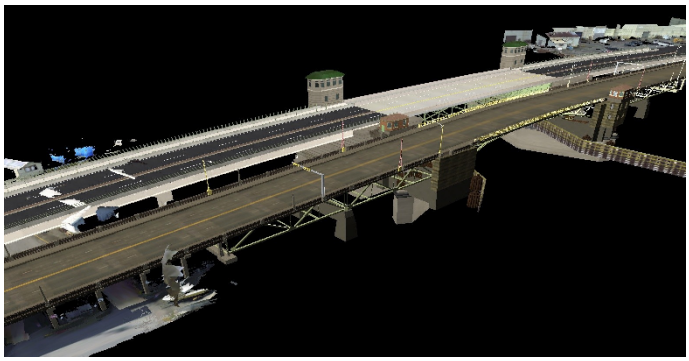
The Utah Department of Transportation (UDOT) will use this fund to assist the 4500 South over I-215 bridge replacement project. A SPMT (Self Propelled Module Transporter) technique will be used on this project. It will be the most challenging operation SPMT has ever faced for bridge movement to date. The 4500 South bridge super structure weighs 1,600 tons. The most challenging issues for SPMT deployment are a) I-215 NB and SB has 5 feet in elevation difference, and b) the bridge has 11% slope. On October 28, 2007, many FHWA and neighboring state DOT officials will be invited to come and watch this operation. The 4500 South bridge replacement has been designated as the showcase for Accelerated Bridge Construction (ABC) by FHWA Office of Bridge Technology in Washington, D.C.

For more information about this visit, or the use of Accelerated Bridge Construction on 4500 South, please contact Mr. Daniel Hsiao at 801-965-4638, dhsiao@utah.gov.

BRIDGE VISULIZATION:

By: Daniel Hsiao, UDOT Research Division

The Utah Department of Transportation office of Research recognizes that the world of roads, bridges and public infrastructure is going 3-D. UDOT is a frontrunner with this 3-D technology, and has just completed a series of projects for which 3-D was the standard.



To accomplish the 4500 S. bridge replacement project, UDOT has partnered with a local company, InteliSum Inc. (ISI), who is helping to lead this transition to 3-D design. InteliSum launches from the foundation technology of Light Detection and Ranging (LIDAR). ISI's technology uses its 3-D LIDAR based "InteliCamera" to capture LIDAR, XYZ data points and fuse RGB digital pixel information to each LIDAR point in real time. Also, at the time of data capture, Global Coordinate System (GCS) information associated with each LIDAR point is added to create real world 3-D scenes with "Intelligence".

Visualization capability on this project will allow UDOT to showcase the entire bridge project. ISI will show the visualization of the staging area that allows the new bridge to be stored, as well as the holding area, and actual machinery that will be used. ISI will be able to show the old bridge in a real world environment, and the use of machinery to remove the old bridge.

UDOT is excited about all the many different uses that are being generated by ISI. Research is very interested to use this new technology on other projects. For more information about UDOT and their work with InteliSum please contact Ms. Shana Lindsey rlindsey@utah.gov or Mr. Daniel Hsiao dhsiao@utah.gov

WEB DELIVERED TRAINING:

By: Blaine Leonard and Abdul Wakil, UDOT Research Division

Part of the mission of the Research Division is to share new technologies and ideas. Sometimes this takes the form of training. We have recently begun providing some brief, information-packed training seminars for UDOT personnel which are delivered through the web. Known as "webinars", these are live seminars provided by national experts on a variety of topics. The webinars are produced by the American Society of Civil Engineers (ASCE). We connect to the seminar through the internet and the phone line. The internet connection allows us see the presentation, and that phone line provides the audio portion of the presentation. A "chat box" on the internet screen allows us to type questions during the presentation, and the presenter can answer those questions in real time.

Webinars recently provided by the Research Division include "Deterioration and Repair of Concrete" and "The Engineers Survival Kit". These were excellent presentations with useful information and insights. In addition, these seminars provide continuing education credits for the renewal of our Professional Engineer licenses. Two more webinars are scheduled in the near future: "Ethics: The Road Engineers Must Follow", on June 14, and "Personal Time Management", on August 1. A few other topics are currently being considered. Please contact Blaine Leonard, bleonard@utah.gov or Abdul Wakil awakil@utah.gov in the Research Division for more information about these webinars, or if you have ideas about other topics that should be presented.

COMPLETED UDOT RESEARCH

Research publications are valuable resources, documenting the results of important research projects. For a list of recently completed Research Projects, please visit the Research & Development website at: http://www2.udot.utah.gov/index.php?m=c&tid=235. If you would like to obtain an electronic copy or a printed copy of our completed research, please contact Abdul Wakil awakil@utah.gov or Joni DeMille jdemille@utah.gov

NEED A LITERATURES SEARCH?

The UDOT Research Division and Lester Wire Library provide an important service through literature searches. These searches help identify published information about a topic of interest. To request a search, provide a brief description and some key words and submit it to Abdul Wakil awakil@utah.gov , Joni DeMille jdemille@utah.gov. Or you can submit your request online @ http://www.udot.utah.gov/index.php/m=c/tid=895/

Please send your comments and questions about this Newsletter to Abdul Wakil awakil@utah.gov or (801) 964-4455